

Abstract Submitted
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Rapid Mold Replication*

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The desire to reduce tooling costs have driven manufacturers to investigate new manufacturing methods and materials. In the plastics injection molding industry replicating molds to meet production needs is time consuming (up to 6 months) and costly in terms of lost business. We have recently completed a feasibility study demonstrating the capability of high rate electron beam physical vapor deposition (EBPVD) in producing mold inserts in days, not months. In the current practice a graphite mandrel, in the shape of the insert's negative image, was exposed to a jet of metal vapor atoms emanating from an electron beam heated source of an aluminum-bronze alloy. The condensation rate of the metal atoms on the mandrel was sufficient to allow the deposit to grow at over 1.5 mils per minute. The vaporization process continued for approximately 10 hours after which the mandrel and deposit were removed from the EBPVD vacuum chamber. The mandrel and condensate were easily separated resulting in a fully dense aluminum-bronze mold insert about one inch thick. This mold was subsequently cleaned and drilled for water cooling passages and mounted on a fixture for operation in an actual injection molding machine. Results of the mold's operation were extremely successful showing great promise for this technique. This paper describes the EBPVD feasibility demonstration in more detail and discusses future development work needed to bring this technique into practice.

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To
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Last week I was asked by Robert Poole of Sandia-Albuquerque if we would submit an abstract to the 27th International SAMPE Conference to be held in Albuquerque in October. This is put on by the Materials Research Society and he is chairing a session on rapid prototyping. Attached is a draft of our proposed abstract. The abstract needs to be between 100 and 200 words and ours is about 150. Please feel free to comment on the draft including the proposed author list. The draft needs to be in by the end of the month. The subsequent paper needs to be in by June 30th.

Glenn